This document is classified as **White** in accordance with the Panel Information Policy. Information can be shared with the public, and any members may publish the information, subject to copyright.

SECMP0046 'Allow DNOs to control Electric Vehicle chargers connected to Smart Meter infrastructure'

Business Requirements – version v0.9

About this document

This document is the business requirements for [SECMP0046 'Allow DNOs to control Electric Vehicle chargers connected to Smart Meter infrastructure'](#). It provides detailed information on the business requirements for the proposed solution agreed on by the Working Group, Data Communications Company (DCC) and Proposer. It also summarises the Working Group's considerations and assumptions for each business requirements with respect to this Modification Proposal.

Managed by
Gemserv

1. Considerations and assumptions

1.1 General

The following contains the considerations and assumptions for each business requirement that will, or may, need to be fulfilled to implement SECMP0046. This covers those requirements that are applicable the DCC, as well as to Electricity Distributors, and any other considerations beyond the scope of this modification and the SEC.

1.2 The DCC

The DCC are requested to consider all requirements that are applicable to the DCC systems in designing a solution for the following requirements. Non-DCC impacting requirements (labelled non DCC) are concerning governance and obligations that lie elsewhere.

Of the DCC impacting requirements, some are considered non-essential, as discussed in Working Groups and agreed with the Proposer. The requirements that are to be assessed by the DCC are categorised as high, medium and low in regard to the priority of the requirements in the Preliminary Assessment of this SEC Modification. The DCC are expected to assess the impact of the costs of the all requirements against the solution. This will enable a cost benefit analysis of the requirements (especially for low and medium priority requirements) by the Working Group and Proposer.

1.3 Use Case

This modification will allow Electricity Distributors to alter charging of domestic Electric Vehicles, targeted at preventing overloading events on low voltage networks. This intervention is intended to be used where the lead time to implement alternative solutions may lead to network outages. The changes implemented as a result of this modification are not intended to replace any current standard processes for prevention of an overloading event.

1.4 Assumptions

The following assumptions are made in developing the following solution design specification:

- An Electric Vehicle charger will not be defined as a SMETS Device, meaning:
    - EV chargers will not join a HAN;
    - It will not be possible to send any Service Request with a target of EV charger;
    - GBCS will not be updated to enable HAN communications with an EV charger.
- Control of EV chargers will be enabled via ALCS / HCALCS, and:
    - Electricity Distributors will be able to control the EV charger via ALCS / HCALCS, meaning the Electricity Distributers User Role will become eligible users for identified

Service Requests (and will not have to establish relationships with relevant Import Suppliers to send such instructions);

- o Responsibility for installing HCALCS is out of scope

- Whether an EV Charger can interpret an HCALCS signal is out of scope of this Modification, meaning:

  - o An HCALCS and EV charger may be wired in series, with the resulting being that power to the EV charger is cut;

  - o Dependent on how the market develops, an EV charger may be able to identify the switch's state and interpret this as a signal to charge at different amperages (not necessarily on or off). This will occur through competitive forces or via other governance such as OLEV secondary legislation.

- Requirements to systematically populate details of the demand controlled by HCALCS may become mandatory to enable accurate identification of load under control and to minimise the risk of accidental curtailment of load.

2. Business requirements

This section contains the functional business requirements for the modification as a whole, of which, not all apply to the DCC. Based on these requirements a full solution will be developed.

Business Requirements	
Ref.	**Requirement**
1 (non DCC)	Electricity Distributors will monitor load demand on low voltage networks (Feeders)
2 (High Priority)	Electricity Distributors will have the ability to alter charging amperage of domestic Electric Vehicle chargers
3 (Medium Priority)	Electricity Distributors will be able to join necessary devices (rather than requesting an Import Supplier to do so)
4 (Medium Priority)	The customer can decline alteration of electricity supply to their domestic Electric Vehicle chargers
5 (non DCC)	Electricity Distributors will report instances when they alter domestic Electric Vehicle charging to Ofgem
6 (non DCC)	Governance that is out of scope for this modification and out of scope for the SEC

2.1 Requirement 1 (non DCC): Electricity Distributors will monitor load demand on low voltage networks (Feeders)

Electricity Distributors will measure the electricity demand of low voltage networks that have been assessed as "high risk" and asses if load is likely to exceed the capacity of that particular low voltage network.

The Electricity Distributor must:

- Determine which low voltage networks are 'high risk';

- Monitor the electricity load on the "high risk" low voltage network; and

- Asses if the measured load exceeds / will likely exceed the capacity of the low voltage network.

2.2 Requirement 2 (High priority): Electricity Distributors will have the ability to alter charging amperage of domestic Electric Vehicle chargers

If an Electricity Distributor deems that one of their low voltage networks are at risk of an overloading event, they will need to manage load on the network. To achieve this, all current load control methods

will be used. However, failing these overload prevention methods, the Electricity Distributor will have the ability to alter charging of domestic Electric Vehicles via Smart Metering infrastructure.

Domestic Electric Vehicle charger

To enable Electricity Distributors to use Smart Metering infrastructure to alter domestic Electric Vehicle charging, the Electric Vehicle charger must be connected to the Smart Metering System. Through Working Group discussions, it was decided that the best approach for this would be through the use of Home Area Network (HAN) Connected Auxiliary Load Control Switch (HCALCS).

The Smart Metering System connected device must:

- Be able to receive an external signal;

- Be able to react to the Command of that signal;

- Be able to send a signal;

- Be labelled accurately on the ALCS/HCALCS list on the ESME; and

- Require Certified Product Assurance (CPA).

This is applicable to the Electric Vehicle charging device and/or any device it may be connected to.

Smart Metering signal

To enable Electricity Distributors to use Smart Metering infrastructure to alter domestic Electric Vehicle charging, they must be able to send the appropriate signals via the DCC. For this to occur the DCC must allow the Electricity Distributor to send a signal through the DCC Systems to a domestic Electric Vehicle charger and/or connected device at a specified Meter Point Administration Number (MPAN):

- The signal will be translated to a Critical Command by the DCC;

- The DCC will send the Command to the Smart Meter System;

- The Command will be received by the Smart Meter; and

- The charger will curtail the charging amperage of the domestic Electric Vehicle.

The signal, and any subsequent Commands, must be secure and sent via a secure network.

Priority of these signals sent to the domestic Electric Vehicle charger via the Smart Metering infrastructure will be given to the Electricity Distributor over other eligible User Roles.

The Electricity Distributor will set an Anomaly Detection Threshold (ADT) on these commands. The value of this ADT will be determined by the outcomes of 2.5   Requirement 5 (non DCC): Electricity Distributors will report instances when they alter domestic Electric Vehicle charging to Ofgem.

Signal time constraints

There will only be 5-10 minutes between alert of an overloading event and failure of the low voltage network. Therefore, the targeted response time of this signal shall be 30 seconds.

The signal will curtail the domestic Electric Vehicle charging for a set period of time (see 2.6 Requirement 6 (non DCC): Governance that is out of scope for this modification and out of scope for the SEC), where after this period the Electric Vehicle will resume normal charging. In the event that the curtailing of the Electric Vehicle charging was performed in error, or is deemed to be no longer needed, the Electricity Distributor will have the ability to send a subsequent signal within this time period to cancel the alteration of the Electric Vehicle charging.

2.3 Requirement 3 (Low priority): Electricity Distributors will be able to join necessary devices (rather than requesting an Import Supplier to do so)

Discussed in the Working Group, there may be a need to place an obligation on the Electricity Distributors to complete as much of the installation process. Therefore, the Electricity Distributor may require the means to join the required device to alter domestic Electric Vehicle charging to the Smart Metering System. This will include all relevant signals to:

- Whitelist the device to the Communications Hub; and

- Join the device to the ESME.

The Electricity Distributor must also label the HCALCS on the ESME to reflect that it is connected to an Electric Vehicle charger. Therefore, Electricity Distributors must have the ability to send the relevant signals to do this.

2.4 Requirement 4 (Medium priority): The customer can decline alteration of electricity supply to their domestic Electric Vehicle chargers

Customer consent is to be gained by the Electricity Distributor to allow them to use Smart Metering to alter charging of domestic Electric Vehicles. The customer shall have the ability to outright decline the Electricity Distributor altering the charging of their Electric Vehicle and may also have the ability to override each instance that their Electric Vehicle charging has been curtailed.

Customer engagement (non DCC)

Customers of the Electricity Distributor that have a domestic Electric Vehicle charger will able to decline Electricity Distributors from altering the charging of their Electric Vehicle. The electricity Distributor must:

- Seek consent from the customer for the Electricity Distributor to alter charging of their Electric Vehicle;

- The Electricity Distributor must notify the customer at a frequency to be agreed in the event the they have limited the customers load; and

- If there is a Change of Tenancy (CoT), the Electricity Distributor must engage with the new customer and seek permission for load control.

The Electricity Distributor may also gain consent to alter the charging of other high wattage device connected to the customers Smart Metering System.

Customer override

In the event that an Electricity Distributor curtails the charging of a customer's Electric Vehicle, the customer will have the ability to override this. The customer will be able to achieve this through their Smart Metering System. The Working Group discussed and agreed that, if implementation costs are low, then the Electricity Distributors will have the ability to send the relevant signals Service Requests to add and remove the auxiliary load to the Boost Button, as well as read the Boost Button Details.

2.5 Requirement 5 (non DCC): Electricity Distributors will report instances when they alter domestic Electric Vehicle charging to Ofgem

When an Electricity Distributor curtails domestic Electric Vehicle charging to prevent an overloading event on a low voltage network, they will report this to Ofgem in a format to be agreed. This report is likely to contain:

- How many, MPANs have been affected;
- When this event occurred; and
- The longest events (i.e. list of "worst served" customers)

Obligations for Electricity Distributor to report to Ofgem under Supply Licence Conditions (SLC) and Regulatory Instructions and Guidance (RIGs) for RIIO-ED1 fulfil these reporting requirements.

2.6 Requirement 6 (non DCC): Governance that is out of scope for this modification and out of scope for the SEC

To enable and facilitate this modification to the SEC, further governance and regulation would be required elsewhere.

Electric Vehicle charging alteration duration

The period of time that a domestic Electric Vehicle has its charging altered will need to be defined. This is out of the scope of the SEC; however, it has been identified that it may be covered in DCUSA under Schedule 8 'Demand Control'. This may need to be amended to define a duration that Electric Vehicle charging is altered for.

Usage limits

Limits of use for using Smart Metering infrastructure to alter domestic Electric Vehicle charging will need to be defined. This should include maximum amount that altering of Electric Vehicle charging can be performed in:

- A 24-hour period; and

- A 30-day period.

This will need to be defined as either; the amount of times that the alteration of charging is performed in that period, or the combined duration of time within that period that charging has been altered.

If usage of Smart Metering infrastructure is consistently used to manage load on low voltage networks by altering Electric Vehicle charging, or exceeds the defined limits of use, then the Electricity Distributor will need to find suitable alternative solutions. This will be accompanied by a defined period of time that the Electricity Distributor has to seek this solution, followed by a defined period that they then have to implement the solution.

3. Solution design specification

3.1 General

The following outlines the solution design specifications discussed with the Working Group and the DCC, to fulfil the above business requirements. It broadly describes the changes needed to the SEC and the DCC Systems to enable the Electricity Distributor to alter charging of domestic Electric Vehicles.

Upon requesting a Preliminary Assessment, the DCC are asked to consider this following solution, alongside any other solution(s) they believe will also fulfil the described business requirements.

3.2 HAN Connected Auxiliary Load Control Switch

The Working Group discussed multiple possible solutions to the requirements. Out of those solutions, they believe that a Home Area Network (HAN) Connected Auxiliary Load Control Switch (HCALCS) connected to a domestic Electric Vehicle charger would be the most cost effective and easiest solution to implement. The following specifications that would be required to do this were discussed.

Specification 1: Electricity Distributors will have the ability to reduce the load using HCALCS

Where there is an imminent risk of an overloading event, the Electricity Distributors for that low voltage network can alter the charging rate of domestic Electric Vehicles on that network. HCALCSs & Auxiliary Load Control Switches (ALCSs) are binary switches so only two settings are available, 'deactivated' (switch is open) or 'activated' (switch is closed). How this charger interoperates the signal to the HCALCS and how it reacts to it, is expected to be determined through the Department for Business, Energy & Industry Strategy (BEIS) competition[1][2].

The Electricity Distributors should be able to send Service Request Variants (SRVs) 7.6 and 7.8 though the DCC to an HCALCS connected domestic Electric Vehicle charger.

- SRV7.6 would allow the Electricity Distributors to open the switch, resulting in the reduced charge amperage.

- SRV7.8 would allow the Electricity Distributors to reset a switch's status to that set by the calendar (default). This should only be used if an erroneous instruction is sent, or if the anticipated reduction of Electric Vehicle charging is no longer required.

These SRVs have a target response time of 30 seconds, which will be sufficient in reducing the likelihood a failure event. Both SRV 7.6 and 7.8 are Critical Service Requests and the modification process will determine any impact on User Security Assessments. For this the Security Sub-Committee (SSC) will be notified of any changes to User eligibility for Critical SRV, as the User CIO assessment will need to be updated.

---

[1] https://www.delta-esourcing.com/delta/respondToList.html;jsessionid=EB2ED9FA5378B2F984AC96972D431124?noticeId=347436628

[2] https://www.contractsfinder.service.gov.uk/Notice/5a6f6d7b-c0d7-407a-80cd-de4e78140fc0

Specification 2: The ALCS/HCALCS labels will be made compulsory

SECMP0025 'Electricity Network Party Access to Load Switching Information' granted Electricity Distributors eligibility to send SRV7.7, which would allow Electricity Distributors to read ALCS/HCALCS labels and switch status. This enables the Electricity Distributors to Identify the HCALCS switch connected to the Electric Vehicle. When SECMP0019 'ALCS Description Labels' was implemented to define standardised ALCS/HCALCS labels, it was not made compulsory for these switches to be labelled. However, this would be required to ensure that Electricity Distributors are switching off an HCALCS connected to Electric Vehicle chargers and not any other ALCS/HCALCS connected devices. It would need to be mandatory for ALCS/HCALCS to be labelled accurately.

Specification 3 (optional): Electricity Distributors will have the ability to alter the Boost Button on HCALCS

The Boost Button functionality allows a consumer to override HCALCS on a connected device. A consumer may override a signal from the Electricity Distributors to alter the charging of Electric Vehicles in an overloading scenario, therefore the Electricity Distributors may need the ability to send SRVs 7.9, 7.10, and 7.11.

- SRV7.9 would allow the Electricity Distributors to add auxiliary load to the Boost Button, granting the consumers the ability to override HCALCS.

- SRV7.10 would allow the Electricity Distributors to remove auxiliary load from the Boost button, denying the consumers the ability to override HCALCS.

- SRV7.11 would allow the Electricity Distributors to read the Boost Button details.

- It is also possible that the boost capability could be provided as part of the EV charger.

Specification 4 (optional): Electricity Distributors will have the ability to Whitelist the HCALCS to the Communications Hub, and Join the HCALCS to the ESME

To enable the Electricity Distributor to fully install and commission a HCALCS connected domestic Electric Vehicle charger, they will need to be eligible to send further SRVs; 8.7.1, 8.8.1, and 8.11.

- SRV8.7.1 would allow the Electricity Distributor to Join the HCALCS and the Electricity Smart Meter (ESME).

- SRV8.8.1 would allow the Electricity Distributor to Un-Join the HCALCS and the ESME.

- SRV8.11 would allow the Electricity distributor to Whitelist the HCALCS to the Communications Hub.

Currently only Suppliers (and Other Users for SRV 8.11) can send these SRVs, however, there may be a need to place an obligation on the Electricity Distributors to send these SRVs. This would also allow the Electricity Distributor to get the HCALCS commissioned in a timely manner in cases of urgency.

4. Glossary

This table lists all the acronyms used in this document and the full term they are an abbreviation for.

Glossary	
Acronym	**Full term**
ADT	Anomaly Detection Threshold
ALCS	Auxiliary Load Control Switch
BEIS	Department for Business, Energy & Industry Strategy
CoT	Change of Tenancy
CPA	Certified Product Assurance
DCC	Data Communications Company
DCUSA	Distribution Connection and Use of System Agreement
ESME	Electricity Smart Meter
HAN	Home Area Network
HCALCS	HAN Connected Auxiliary Control Switch
MPAN	Meter Point Administration Number
RIGs	Regulatory Instructions and Guidance
SLC	Supply Licence Conditions
SRV	Service Request Variant
SSC	Security Sub-Committee